

# Asymptotically safe gravity as a guiding light to particle phenomenology

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Compelling evidence suggests the existence of new physics beyond the Standard Model. However, in the absence of new experimental data, the energy scales associated with this new physics remain unknown. In this talk, I will give an overview of how the asymptotic safety paradigm can offer insights into these unknowns, addressing several of the outstanding puzzles and challenges within the Standard Model. Specifically, I will discuss how the presence of a specific fixed point structure in the renormalization group flow of model parameters—induced by gravitational corrections above the Planck scale—has several interesting implications. Firstly, I will discuss how this framework could lead to predictions of the new-physics couplings in  $U(1)$ ' extensions of the Standard Model. As a second example, I will discuss how this paradigm could give rise to a dynamical mechanism to generate small neutrino masses in the gauged B-L extension and its phenomenological signatures. Finally, I will demonstrate how asymptotically safe gravity can make a measurable contribution to the SMEFT coefficients, challenging the expectation that such contributions are suppressed by the Planck scale.

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